Patent claims:

1. A method of preparing seamless capsules having a polysaccharide gel membrane on the outer surface, comprising the steps of:

(a) preparing an emulsion comprising oil, water, an emulsifier, and at least one of a water-soluble monovalent metal salt, polyvalent metal salt, and an acid, wherein said oil is present in an amount of at least 50% by weight of said emulsion; with the proviso that said emulsion does not contain marmelo mucilage; and

(b) adding portions of said emulsion to an aqueous gelling bath comprised of at least one ionic polysaccharide thereby encapsulating said portions of said emulsion in a polysaccharide gel membrane, and optionally

(c) drying the resulting capsules by removing water.

2. The method of preparing the seamless capsules of claim 1, further comprising the step of:

adding a further solid, or liquid or gaseous component prior to step b) to at least one of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid prior to or after formation of the emulsion and mixing to a dispersion.

3. The method of claim 1, wherein said emulsion is an oil-in-water emulsion.

4. The method of claim 1, wherein said emulsion is a water-in-oil emulsion.

5. The method of claim 1, wherein said emulsion is a water-in-oil-in-water emulsion.

6. The method of claim 1, wherein said emulsion further contains a pharmaceutical active agent, a veterinary active agent, a nutritional supplement, an agricultural active agent, cosmetic ingredient, colorant or a food.

7. A method of claim 2, wherein said solid, or liquid or gaseous component is selected from the group consisting of a pharmaceutical active agent, a veterinary active agent a nutritional supplement, an agricultural active agent , a cosmetic ingredient, colorant and a food.

8. A method of claim 6 or 7, wherein the amount of components added to the emulsion of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid, is present in amounts up to 85% by weight of the dried capsule.

9. A method of claim 8, wherein the amount of components added to the emulsion of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid, is present in amounts from 30 % up to 85% by weight of the dried capsule.

10. The method of claim 1, wherein said oil is present in an oil-in-water emulsion in an amount of 70% by weight to 98% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

11. The method of claim 10, wherein said oil is present in said oil-in-water emulsion in an amount of 85% by weight to 95% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

12. The method of claim 1, wherein said oil is present in a water-in-oil emulsion in an amount of 65% by weight to 85% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

13. The method of claim 12, wherein said oil is present in said water-in-oil emulsion in an amount of 70% by weight to 80% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

14. The method of claim 1, wherein said oil is present in a water-in-oil-in-water emulsion in an amount of 60% by weight to 90% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

15. The method of claim 14, wherein said oil is present in said water-in-oil-in-water emulsion in an amount of 70% by weight to 80% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

16. The method of claim 1, wherein said water-soluble monovalent or polyvalent metal salt is present in an amount of up to 25% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid .

17. The method of claim 16, wherein said salt is present in an amount of 2% by weight to 15% by weight of said oil, water, emulsifier and at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid.

18. The method of claim 1, wherein said emulsifier has a hydrophilic-lipophilic balance (HLB)- value in the range of 1 to 19.

19. The method of claim 18, wherein said emulsifier is polyoxyethylene(20) sorbitan monolaurate, polyglycerol polyricinoleate, calcium stearoyl-2-lactylate, sorbitan monooleate, or mixtures thereof.

20. The method of claim 19, wherein said emulsifier is polyoxyethylene(20) sorbitan monolaurate, polyglycerol polyricinoleate, or mixtures thereof.

21. The method of claim 1, wherein said water-soluble monovalent or polyvalent metal salt is at least one salt of sodium, potassium, calcium, strontium, barium, magnesium, and aluminum.

22. The method of claim 21, wherein said salt is calcium chloride.

23. The method of claim 1, wherein said at least one ionic polysaccharide is present in an amount of from 0.1% by weight to 10% by weight of the gelling bath.

24. The method of claim 23, wherein said weight of said at least one ionic polysaccharide is from 0.5% by weight to 7% by weight, preferably 1% by weight to 5% by weight of the gelling bath.

25. The method of claim 23, wherein said at least one ionic polysaccharide is an alginate, a carrageenan, a chitosan, a pectin, sodium carboxymethylcellulose, propylene glycol alginate, or mixtures thereof.

26. The method of any of the preceding claims 1-25, wherein the gelling bath further comprises one or more secondary film former in an amount up to 40% by weight of the gelling bath.

27. The method of claim 1, where said capsule is enteric or delayed release.

28. The method of any of the claims 26 or 27, where the secondary film former is selected from the group of cellulose acetate phthalate, cellulose acetate succinate, methyl cellulose phthalate, ethylhydroxycellulose phthalate, polyvinylacetatephtalate, polyvinylbutyrate acetate, vinyl acetate-maleic anhydride copolymer, styrene-maleic mono-ester copolymer, methyl acrylate-methacrylic acid copolymer, methacrylate-methacrylic acid-octyl acrylate copolymer, or mixtures thereof.

29. The method of claim 1, where said capsule is immediate release.

30. The method of any of the preceding claims 26 or 29, where said secondary film former is selected from the group of propylene glycol alginate, polyvinyl alcohol, carrageenans, pectins, chitosans, guar gum, gum acacia, sodium carboxymethylcellulose,

hydroxypropylmethyl cellulose, hydroxypropylcellulose, methylcellulose, starches, maltodextrins, or mixtures thereof.

31. Method of any of the preceding claims 1-30 or the claims 32-44, wherein said capsules are washed with an aqueous solution, or an aqueous solution of alcohol after encapsulation.

32. The method of claim 25, wherein said at least one ionic polysaccharide is an alginate having a weight-average molecular weight of 20,000 Daltons to 500,000 Daltons.

33. The method of claim 25, wherein said at least one ionic polysaccharide is a mixture of (i) an alginate having a weight-average molecular weight of 30,000 Daltons to 40,000 Daltons, and (ii) an alginate having a weight-average molecular weight of 150,000 Daltons to 500,000 Daltons.

34. The method of claim 33, wherein said mixture of (i) and (ii) is in a ratio of 0.1 to 20 of (i) to 1 of (ii), respectively.

35. The method of claim 34, wherein said ratio is 1 to 16 of (i) to 1 of (ii), respectively.

36. The method of claim 32, wherein said alginate has a G content of at least 30%.

37. The method of claim 36, wherein said G content is 40% to 80%.

38. The method of claim 1, wherein said gelling bath is maintained at a temperature of at least 20 °C during step (b).

39. The method of claim 38, wherein said temperature is in the range of 30 °C to 70 °C.

40. The method of claim 1, wherein said addition in step (b) is conducted during a period of time of up to 240 minutes.

41. The method of claim 40, wherein said period of time is from 2 minutes to 60 minutes.

42 The method of claim 41, wherein said period of time is from 5 minutes to 20 minutes.

43. The method of claim 1 or 2, further comprising coating said capsules with a secondary film-former, or a sequestrant, or a secondary film-former and a sequestrant.

44. The method of claim 43, wherein said coating is conducted simultaneously with a step of drying said capsules.

45. Seamless capsule having a polysaccharide gel membrane on the outer surface, prepared by a method comprising the steps of:

(a) preparing an emulsion comprising oil, water, an emulsifier, and at least one of a water-soluble monovalent metal salt, polyvalent metal salt, and an acid, wherein said oil is present in an amount of at least 50% by weight of said emulsion; with the proviso that said emulsion does not contain marmelo mucilage; and

(b) adding portions of said emulsion to an aqueous gelling bath comprised of at least one ionic polysaccharide thereby encapsulating said portions of said emulsion in a polysaccharide gel membrane, and optionally

(c) drying the resulting capsule by removing water.

46. Seamless capsule of claim 45, further comprising the step of:
adding a further solid, or liquid or gaseous component prior to step b) to at least one of said oil, water, emulsifier or at least one water-soluble monovalent metal salt, polyvalent metal salt, and acid prior to or after formation of the emulsion and mixing to a dispersion.

47. Seamless capsule of claim 46, wherein said solid, or liquid or gaseous component is selected from the group consisting of a pharmaceutical active agent, a veterinary active agent, a nutritional supplement, an agricultural active agent, a cosmetic ingredient, colorant and a food.

48. Seamless capsule of claim 47, wherein the amount of components added to the emulsion is present in amounts up to 85% by weight of the dried capsule.

49. Seamless capsule of claim 48, wherein the amount of components added to the emulsion is present in amounts from 30% up to 85% by weight of the dried capsule.

50. Seamless capsule having a polysaccharide gel membrane on the outer surface, said capsules encapsulating an emulsion of oil, water and emulsifier, wherein said oil is present in an amount of at least 50% by weight of said emulsion with the proviso that said emulsion does not contain marmelo mucilage.

51. Seamless capsule of claim 50, wherein the capsule is dried.

52. Capsule of claim 50, having a wet capsule diameter in the range of 1 millimeter to 40 millimeters, wherein said gel membrane has a thickness in the range of 0.3 millimeters to 4 millimeters.

53. Capsule of claim 50, wherein said capsule is dried and said gel membrane is a dry polysaccharide gel film on the outer surface which constitutes up to 30% by weight of the dried seamless capsule.

54. Capsule of claim 53, wherein the dry polysaccharide gel film constitutes up to 10% by weight of the dried capsule.

55. Capsule of claim 50, having a dry capsule diameter in the range of 0.5 millimeter to 35 millimeters, wherein said dry polysaccharide gel film has a thickness in the range of 40 μm to 500 μm.

56. Capsule of any of the preceding claims 45, 46 and 50, wherein said polysaccharide gel membrane is an alginate gel membrane.

57. Capsule of any of the preceding claims 45-56, wherein said capsule is enteric or delayed release.

58. Capsule of any of the preceding claims 45-56, wherein said capsule is immediate release.

59. Capsule of claim 57, wherein said gel membrane further comprises one or more secondary film formers selected from cellulose acetate phthalate, cellulose acetate succinate, methyl cellulose phthalate, ethylhydroxycellulose phthalate, polyvinylacetatephtalate, polyvinylbutyrate acetate, vinyl acetate-maleic anhydride copolymer, styrene-maleic mono-ester copolymer, methyl acrylate-methacrylic acid copolymer, methacrylate-methacrylic acid-octyl acrylate copolymer, or mixtures thereof.

60. Capsule of claim 58, wherein said gel membrane further comprises one or more secondary film formers selected from propylene glycol alginate, polyvinyl alcohol, carrageenans, pectins, chitosans, guar gum, gum acacia, sodium carboxymethylcellulose, hydroxypropylmethyl cellulose, hydroxypropylcellulose, methylcellulose, starches, maltodextrins or mixtures thereof.

61. Capsule of any of the claims 45 or 46, wherein said gelling bath further comprises one or more secondary film former selected from cellulose acetate phthalate, cellulose acetate succinate, methyl cellulose phthalate, ethylhydroxycellulose phthalate, polyvinylacetatephtalate, polyvinylbutyrate acetate, vinyl acetate-maleic anhydride

copolymer, styrene-maleic mono-ester copolymer, methyl acrylate-methacrylic acid copolymer, methacrylate-methacrylic acid-octyl acrylate copolymer, or mixtures thereof.

62. Capsule of any of the claims 45 or 46 wherein said gelling bath further comprises one or more secondary film former selected from propylene glycol alginate, polyvinyl alcohol, carrageenans, pectins, chitosans, guar gum, gum acacia, sodium carboxymethylcellulose, hydroxypropylmethyl cellulose, hydroxypropylcellulose, methylcellulose, starches, maltodextrins or mixtures thereof.